NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

SPRING 2025

DISTANCE COURSES
January 21, 2025 - May 19 2025

CENTER FOR GRADUATE STUDIES

NEW MEXICO TECH
SCIENCE · ENGINEERING · RESEARCH UNIVERSITY

DEGREES

	M.S.	Ph.D.	M.S. Specialization	Ph.D. Dissertation	Course-based only Masters option available
ENGINEERING					
Chemical*	●	●	Surface Engineering	Surface Engineering	●
Civil & Environmental	●				
Computer Science*	●	●			
Electrical	●	●		Cyber Electronic Systems	
Engineering Management*	●				●
Materials*	●	●			●
Mechanical*	●	●	Explosives Engineering; Fluid & Thermal Science; Mechatronics Systems & Robotics; Solid Mechanics	Intelligent Energetic Systems	●
Mineral	●	●	Mineral Exploration; Geotechnical & Geomechanical; Explosives Engineering;		
Petroleum	●	●			
SCIENCE					
Biology	●				
Chemistry	●	●			
Earth & Environmental*	●	●	Geobiology; Geochemistry; Geology; Geophysics; Hydrology	Geobiology; Geochemistry; Geology; Geophysics; Hydrology	●
Mathematics	●	●	Analysis; Industrial Mathematics; Statistics & Data Science	Applied & Industrial Mathematics	
Physics	●	●	Instrumentation	Astrophysics; Atmospheric Physics; Instrumentation; Mathematical Physics	
Transdisciplinary Biotechnology		●			
Transdisciplinary Cybersecurity*	●	●			●
Science for Teachers*	●				●
Public Engagement*	●				

* Programs offering distance/hybrid education

GRADUATE CERTIFICATES:

Alternative Licensure - Elementary
Alternative Licensure - Secondary
Cybersecurity*
Electrical Engineering
Explosives Engineering*

Geothermal Engineering* (new - going through final approvals)
Hydrology*
Scientific & Professional Communication*
Technology Leadership*

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https://www.nmt.edu/gradstudies/
graduate@nmt.edu

STATE OF NEW MEXICO

HOME OF :

Los Alamos National Laboratories

Sandia National Laboratories

Kirtland Air Force Base

Industries such as aerospace, defense, solar

energy, and semiconductor manufacturing

Great weather

Beautiful sunsets

Rich History

Diverse Culture

Amazing Outdoors

RESEARCH

$100M+ 2023-2024 Research Expenditure

Majority of full time graduate students at NMT receive financial aid in the form of teaching and/or research assistantships, fellowships, or part-time employment

RICH HISTORY

In 1889, Socorro was a mining boom town, wild, raucous, and, at a population of about 4500, one of the largest towns in New Mexico.

The Territorial Legislature, wanting to boost New Mexico's economy, decided to found a School of Mines to train young mining engineers, and Socorro was the ideal location. The New Mexico School of Mines (NMSM) proudly opened its doors on September 5th, 1893, with one building, two professors, and seven students. Courses offered included chemistry and metallurgy. Some accomplishments since then include:

Dr. E.J. Workman, NMT President (1946-1965), was a physicist and researcher who led the team that designed the proximity fuse.

One of New Mexico Tech's inventions is the nicotine patch resulting in a patent in 1986. Frank Etscorn came up with this idea while conducting research on nausea.

CHEMICAL ENGINEERING

The Department of Chemical Engineering offers coursework and research thesis with an emphasis on surface engineering and industry focused skills.

Opportunities to work in close collaboration with national laboratory scientists and in industry funded projects are available. Diverse research areas include: Catalysis & Reactions Engineering; Nanotechnology; Renewable Energy; Biomedical Engineering; Polymer Science; Molecular and Multi-scale Modeling; and Colloidal Science and Interfacial Phenomena.

CH E 5053 - Advanced Separation Processes   MWF   09:00-09:50

Applications of interfacial mass transfer including liquid-liquid, gas-solid, and liquid-solid separation based techniques. Processes include adsorption, crystallization, chromatography, and membrane based separations.

CH E 5063 - Design and Analysis of Experiment   MWF   12:00-12:50

Learn how to plan, design and conduct experiments efficiently and effectively, and data analysis to draw conclusions. Both design and statistical analysis issues are discussed. Students will learn how to utilize standard statistical software packages for design and analysis of experiments....

CH E 5072 - Interfacial Transport Phenomenon   TR   11:00-12:15

Advanced topics in momentum, heat, and mass transfer applied to interfacial transport processes. Newtonian and non-Newtonian fluid behavior and laminar flow problems, elementary turbulent flow concepts, energy balance applications in incompressible fluid flow, flow and vacuum production...

Scan the QR code above to get a more detailed course description

The Department of Computer Science and Engineering is focused on an exciting and rapidly growing body of knowledge with constantly changing emphasis. The curriculum of the department includes courses in both theory and application. It prepares students to apply the principles of logic and mathematics to the design and construction of hardware and software systems using current engineering paradigms and also exposes them to major applications of computing.

CSE 5089 - Formal Security Policy Models and Formal Securirity Methods   R   15:30-18:00

Security policy is the definition of what it means to be secure for a system, organization or other entity. Some useful security policies are expressed quite imprecisely and still have value to cybersecurity operations...

CSE 4023 - Compiler Writing   TR   12:30-13:45

Implementation of compilers for higher level computer languages including: parsing, symbol table management, code emission, and code optimization. Each student implements a small compiler and designs an optimizing compiler as a substantial portion of the course grade. Individual and group projects. Practice in developing software requirement, specification, design, and test plan documents.

Scan the QR code above to get a more detailed course description

CYBERSECURITY

Addressing many of the greatest challenges to society requires understanding and integrating the methods, theories, techniques, and perspectives of multiple disciplines to develop new approaches to solve complex, real-world challenges. The mission of the Transdisciplinary Cybersecurity graduate programs is to prepare students with a broad understanding of cybersecurity from the foundational documents that have guided the development of the discipline to the ethical, legal, and psychological challenges that cybersecurity professionals face. Students further engage in hands-on cybersecurity risk analysis, data analysis, and policy development.

CYBS 5003 - Cybersecurity Policy   R   18:00-21:00

A cybersecurity policy course that uses laws and standards to guide organizational policy development to secure information technology resources, without needlessly limiting technical responses, and analyzes both the outcomes of and processes for establishing those laws and standards.

CYBS 5004 - Psychology of Cybersecurity   M   14:00-17:00

A psychology of cybersecurity course that addresses psychology issues from how humans respond to instructions and policies and to how differently hackers and defenders think and their associated motivations.

CYBS 5009 - Cybersecurity Risk Analysis and Management   W   15:00-18:00

This course covers cybersecurity risk analysis and management for information systems. Topics include: threat modeling and analysis; quantitative and qualitative risk assessment; vulnerabilities, threats, witted adversaries, exploits, and mitigations; asset and inventory management; impact analysis, business continuity planning, and disaster recovery planning.

CYBS 5054 - Computer Network Security   W   18:00-21:00

This course will explore each layer of the internet protocol stack, focusing on security deficiencies, and remedies to those security deficiencies, and will involve extensive lab exercises using the Deter Lab shared testbed (accessed via the Internet to enable distance education participants). It will study computer network security architecture and security mechanisms to protect against sophisticated adversarial attacks...

CYBS 5089 Formal Security Policy   R   15:30-18:00

Security policy is the definition of what it means to be secure for a system, organization or other entity. If you express your policy very precisely in terms of information subjects and objects, then you can "prove" some theorems about a system that implements this policy, especially about desired "confidentiality" or "integrity" of data objects, and even some aspects of "availability". This course teaches how you go from a "Policy" to a "Formal Security Policy Model" using first order logic to develop a "Formal Top Level Specification", then apply "Formal Methods" to prove that a design enforces the desired policy.

Scan the QR code above to get a more detailed course description

"NMT facilitates a broad-based STEM program that provides a foundation for success academically and in the workforce"

Emma Stover
MS student and TA
Physics Department

"NMT has given me a phenomenal environment to nurture my intellectual curiosity and provided me with the resources necessary to pursue my research and personal goals"
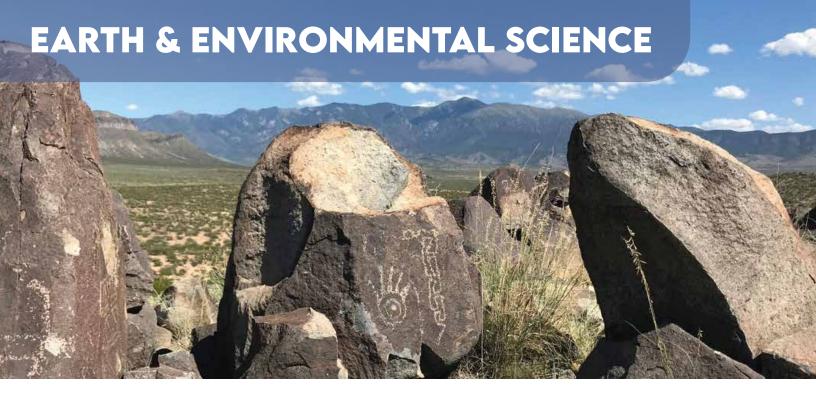
Stephen Albritton
MS student
Mechanical Engineering Department

"New Mexico Tech's expertise in academics and research enables students to create and support the technologies of now and the future"

McKenna Gold
Research Engineer

GEOL 4012 - Introduction To Geographic Information   MW   12:00-12:50

Offered on demand. An introduction to the concepts of geographic information systems (GIS). Theoretical background to GIS; introduction to the nature and analysis of spatial data. ArcView and/or ArcGIS. Shares lecture with GEOL 5012, with additional expectations for graduate credit. Same as ENVS 4012.

GEOL 5012 - Geographical Information Systems   MW   13:00-15:50

An introduction to the concepts of geographic information systems (GIS). Theoretical background to GIS; introduction to the nature and analysis of spatial data. ArcView and/or ArcGIS. Shares lecture with GEOL/ENVS 4012, with additional expectations for graduate credit.

New Mexico Bureau of Geology & Mineral Resources

The Bureau supports geological research in New Mexico and beyond, collaborating with employees, researchers at New Mexico Tech, and other institutions. The laboratories also contribute to education by supporting student research and offering classes on analytical methods, as well as providing hourly employment for NMT students.

From its founding in the 1950s, the Hydrology Program in the Earth and Environmental Science (E&ES) department at New Mexico Tech has been working across disciplines to answer water questions that impact society and the world. Our focus is on building scientific understanding of fundamental processes that will shape global water sustainability for years in the future, and training students to apply these insights in their careers.

HYDR 5008 - Flow/ Transport in Hydrology Systems   TR   08:00-09:15

Examines the principles of flow and transport in geophysical systems including rivers, lakes, aquifers, glaciers, magma, oceans, and the atmosphere. We cover fluid mechanical and thermodynamical properties, fluid statics, fluid kinematics...

HYDR 5047 - Hydrological Modeling   TR   09:30-10:45

Analysis and synthesis of issues in hydrologic science. Related engineering problem solving. Conceptual modeling process: model conceptualization and parameterization, model diagnosis, testing and validation, and model prediction. Conceptual models for testing scientific hypotheses, assimilating data, developing policy, and solving engineering design and operational problems. Applications to land-surface, surface water, vadose zone, and groundwater, singly and together, and to their interfaces with the atmosphere and oceans.

HYDR 5058 - Enviromental Tracers in Hydrology   TR   12:30-13:45

Environmental and artificial tracers in hydrology. Environmental tracer topics may include: atomic structure and abundances of environmental isotopes. Stable isotope fractionation. Mass spectrometry. Applications of the stable isotopes of hydrogen, oxygen, and carbon to meteorology and hydrology...

HYDR 5071 - Advanced Topics in Hydrology   TR   11:00-12:15

Study of special topics in hydrology.

(Scan the QR code to the right in order to get a more detailed course description)

EMGT 5005 - Technology Marketing W 17:00-20:00

This course covers design, development, marketing, and sustaining of new products and technologies both inside and outside an engineering and technology organization. The course also introduces basic methodologies for market research, including data-driven empirical analysis and other qualitative approaches.

EMGT 5009 - Systems Risk and Decision M 17:00-20:00

An advanced treatment on major topics involved in modern engineering decision-making and risk management: fundamental statistics/probability/economics theoretical prelims for decision theory; multi-criteria decision-making and decision making under uncertainty; game theory and its applications; decision making processes and risk evaluation; and an introduction to Monte Carlo and Marko decision processes.

EMGT 5010 - Energy Markets R 17:00-20:00

An overview of different energy markets will be provided as a foundation, to be enhanced by advanced research-oriented lectures that cover managerial methodologies for complex energy policy and environmental assessment issues, including techniques used in modeling business/policy applications for understanding current energy and environmental challenges.

EMGT 5008 - Engineering Project Management T 17:00-20:00

Development of project network models that can be used to plan, monitor, and control complex projects utilizing work breakdown structures, PERT (program evaluation review technique), and CPM (critical path method) analysis. Development of probability models for cost estimate and time-to-completion of each activity, providing a hands-on approach to project risk management.

Scan the QR code above to get a more detailed course description

The Graduate Degree Program in Engineering Management at New Mexico Tech is specifically designed for engineers, scientists, and technologists holding a bachelor's degree in their respective fields who seek the knowledge and practical skills required to lead project teams and organizations through today's competitive and fast changing business environment. Our focus is to provide students with a challenging experience that prepares them to develop and articulate a business case for their next engineering or technology design and development project and lead their team and organization to a successful outcome.

EMGT 5089 - Manegerial Economics   R   17:00-20:00

This course introduces the intermediate microeconomic theory with applications in the area of technology economics and engineering management. Specific topics cover the nature of firms, consumer demand, production theory, cost estimation, market structure and competition, pricing strategies and practices, and firm capital budgeting.

EMGT 5089 - Space Technology History   W   17:00-20:00

Lectures led by experts from the Space Force, dive into the evolution of the space industry, from the 1950s to today's "new space" era. This course offers critical insights into space technology, its business models, and relevant economic policies. It also provides an opportunity to explore scientific and engineering challenges, investment trends, and the ever-changing regulatory landscape in the commercial space industry.

(Scan the QR code to the right in order to get a more detailed course description)

MATERIALS ENGINEERING

The Department of Materials & Metallurgical Engineering at New Mexico Tech offers MS, ME and PhD Materials Engineering degrees in research areas that include Metals, Ceramics, Polymers, Soft Matter, Biomaterials, Energetic Materials, Computational Materials Science, Additive Manufacturing, and Nano/Quantum Materials.

MTLS 3027 - Intro to Physical Metallurgy   MWF   10:00-10:50

Mechanisms of deformation and fracture in metals. Binary phase diagrams. Phase transformations, age hardening, heat treatment of steels, TTT diagrams, CT diagrams, martensitic transformation, shape-memory effects. Common ferrous and non-ferrous alloys.

MTLS 4052 - Solid State Physics for Engineering   MWF   11:00-11:50

Discussion of physical properties of metals, semiconductors, and dielectrics from the viewpoint of solid-state theory. Application of semiconductor and quantum physics to modern electronic and opto-electronic devices.

MTLS 4083 - Scanning Electronic Microscopy   MWF   08:00-8:50

Fundamental theory and experimental techniques in scanning electron microscopy. Electron optics, electron beam interactions with solids, signal detection and processing. Chemical X-ray microanalysis. Undergraduate students majoring in Materials Engineering are required to take MTLS 4083 and MTLS

MTLS 5092 - Materials Engineering Graduate Seminar   W   12:00-12:50

Seminar presentations by students, faculty and outside speakers. Discussion of topics of technical interest in Materials science and engineering and related fields.

Scan the QR code above to get a more detailed course description

MECHANICAL ENGINEERING

MENG 5016 - Plates & Shells   TR   11:00-12:15

Behavior, analysis and design of discrete and continuous plates and shells, membrane and bending behavior, numerical methods of solution.

MENG 5047 - Theory Pyrothechnics & Applictions   F   11:00-13:30

Fundamentals of basic concepts of pyrotechnic. Thermo-mechanical/chemical aspects of pyrotechnics, formulation and mixing of pyrotechnic mixtures, application of pyrotechnic including illumination,

MENG 5072 - Sensor Technology   TR   08:00-09:00

The operating principles and properties of sensors/transducers for the measurement of physical quantities in the mechanical domain, as well as the associated interface circuits. Focus is on commercially available sensors, but where appropriate, recent trends toward miniaturization, integration, and higher quality performance will be addressed.

MENG 5079 - Advanced Heat Transfer   MWF   11:00-11:50

Covers analytical and numerical techniques in conduction, convection, radiation with emphasis on combined heat transfer.

MENG 5089 - Design & Analysis of Experiment   MWF   12:00-12:50

Learn how to plan, design and conduct experiments efficiently and effectively, and data analysis to draw conclusions. Both design and statistical analysis issues are discussed. Students will learn how to utilize standard statistical software packages for design and analysis of experiments.
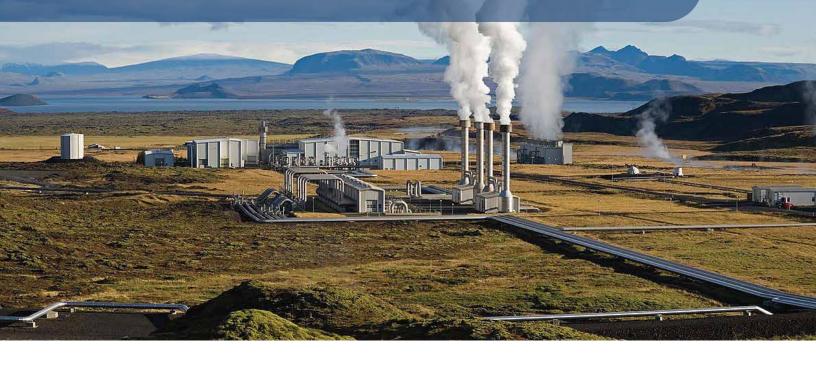
AE 5089 - Space Environment   MWF   08:00-08:50

A pilot course.

Scan the QR code above to get a more detailed course description

PETROLEUM ENGINEERING

PETR 4025 - Well Completion   MW   10:00-10:50

Offered on demand This class covers the basics of carbonate sedimentation and diagenesis and looks at the evolution of carbonate sediments through geologic time (from Precambrian to recent). Included in the class are discussions of the impact of diagenesis on petroleum reservoir and aquifer potential. Shares lecture with GEOL 5025 with additional expectations for graduate credit.

The Graduate Certificate in Geothermal program is created through a partnership between the Petroleum and Natural Gas Engineering, Mechanical Engineering, and Earth and Environmental Science departments. This is a 15 credit program, designed for working professionals, that may be completed in as short as 12-months.

All coursework will be offered in a hybrid format, allowing for both online and in-person instruction. Students will be able to choose from two tracks: Ground Source Heat Pumps/Direct Use/Thermal Storage or Hydrothermal/Engineered Geothermal Systems.

(!) **New!**
Geothermal Engineering Certificate

Going through final approvals

Scan the QR code above to get a more detailed course description

TECHNICAL COMMUNICATIONS

The MS in Public Engagement in Science, Design and Communication teaches students to research, critically analyze and communicate information and technology to diverse communities.

TCOM 5006 - Big Data Culture & Society   TR   15:30-16:45

This project-based course provides students with an introduction to the world of big data scholarship within the context of humanities and communication research. It focuses on both the debates and controversies related to big data collection and the practices/techniques of big data analysis...

TCOM 4007 - Social Justice and Language   TR   11:00-12:15

Pre req of ENGL 1120 or consent of Instructor. The goal of this course is to look at existing social structures and environments with a critical eye focused on maintaining equity for all participants. We will discuss oppression, justice and how language and communication often play a role in these issues.

TCOM 5021 - Documentation Project Management   TR   14:00-15:15

Prerequisites: Graduate Standing or Consent of Instructor. This course discusses the development and writing processes of professional communication documents, which can include computer/software documentation, websites, videos, policy and procedural manuals and instructions. Students gain practical experience working on an in-depth documentation project with real-world clients and developing Materials for users.

NMT's World Famous Taxidermy Drones

This project focuses on developing flapping-wing drone systems using taxidermied birds, replicating natural flight and unlocking numerous possibilities. These drones are notably distinguished by their significant reduction in noise pollution compared to traditional models, alongside increased controllability and maneuverability. With applications spanning from wildlife monitoring to military usage, these drones constitute a groundbreaking technological advancement. This project has gained 6 Billion views across the world.

NEW GRADUATE SCHOLARSHIPS OF $773K FOR NM HIGH SCHOOL GRADUATES STUDYING STEM

Degree Seeking

Non-Degree Seeking

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$1,375 + fees per semester
for 3 credits

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